

Unveiling an uncommon anatomical variation: a case report on mandibular coronoid foramen

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SUMMARY

This case report highlights the rare discovery of a coronoid foramen in the mandible of a 55-year-old woman, a finding that deviates from conventional anatomical norms. The coronoid foramen, an unusual anatomical variation in adults, is often overlooked, emphasizing the need for meticulous exploration and diagnostic imaging in clinical practice. This discovery not only contributes to the growing body of knowledge on anatomical variations but also emphasizes the significance of thorough radiographic assessments for accurate diagnosis and treatment planning in dental and maxillofacial practice.

Key words: Coronoid foramen – Mandible – Anatomical variation

INTRODUCTION

The skeletal system serves as the framework of the human body, providing structural support, protection for vital organs, and guiding a range of movements. The fundamental unit of anat-

omy is the basis for medical diagnosis, care, and treatment. Human anatomy was once considered highly notable, and frequently represented cases of severe anomalies or variations (Bergman, 1988). There have been a handful of documented anatomical investigations of the human mandible that have demonstrated morphological diversity.

Although the existence of these variations as supplementary foramina may presumably support medical personnel in determining appropriate anesthesia and nearly flawless surgical abilities, few individuals still confront challenges for intuitive dental operations (Sferlazza et al., 2022). Using conventional radiographs, this anatomical variation is rarely seen in clinical practice. However, in panoramic radiography, the superimposition of anatomical components that cause distortion and magnification can be misinterpreted by the diagnostician. Conversely, in order to examine these anatomical variations, CBCT is an effective imaging modality that may provide excellent spatial resolution. This was noticeable in our case since the coronoid foramina had been overlooked by the panoramic radiography.

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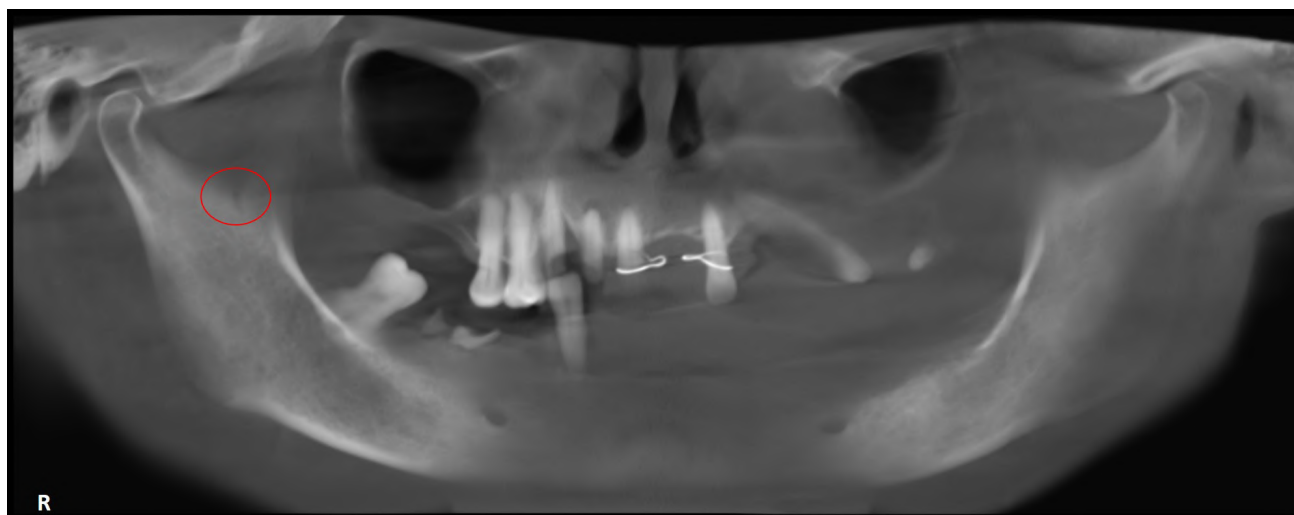


Fig. 1.- Presence of coronoid foramen in the orthopantomogram.

Understanding such anatomical variations helps in learning various surgical methods, such as treatment planning and resolving diagnostic issues (Hast and Garrison, 2000). Therefore, it is crucial to have a solid grasp of clinical anatomy and any potential individual variances in anatomy in order to execute safe and invasive procedures. One such rare variation in the structural morphology of the coronoid process of the mandible is the presence of the coronoid foramen.

Cone-beam computed tomography (CBCT) detected an unforeseen presence of a clearly delineated coronoid foramen in the patient's right mandibular region in this particular instance. The rarity of this anatomical attribute in adult individuals, specifically in the mandible, emphasizes the criticality of thorough anatomical examination and diagnostic imaging in the field of medicine.

CASE REPORT

A 55-year-old female patient presented with a chief complaint of loose teeth in the upper and lower arch and desired to get them replaced. The patient was hypertensive and had Type-2 diabetes mellitus, for which she was getting treatment through medical management. Intraoral examination revealed generalized gingival recession with deep periodontal pockets due to poor oral hygiene. The patient was diagnosed with chronic generalized periodontitis, with a partially edentulous upper and lower arch. A preliminary panoramic radiograph was advised for full mouth extraction,

which exhibits widespread horizontal and vertical bone loss, with a poor prognosis and a questionable oval-shaped radiolucency on the right sigmoid notch, measuring about 1 x 2 mm (Fig. 1).

As the oval-shaped radiolucency was intriguing, CBCT (cone beam computed tomography) was further advised. The 3D-rendered image of the mandible shows a defect in the right sigmoid notch (Fig. 2). Sagittal view shows well-defined radiolucency measuring about 2 x 2 mm, which is 2 cm away from the coronoid process. Orienting in coronal view shows communication with the lingual cortical plate. It was finally found to be a coronoid foramen. The patient was recalled after six months for follow-up; there was no apparent alteration in the panoramic image or CBCT investigation (Fig. 3).

DISCUSSION

Coronoid foramen, also known as 'Foramen of Nyer' (FN), was first discovered by clinical series using CBCT (Firdoose Chintamani Subhan et al., 2023). The coronoid foramen is a small opening that can sometimes be present in the coronoid process of the mandible as a unilateral or bilateral representation. However, it is essential to note that the coronoid foramen is not always present, as its occurrence can vary among individuals and is considered a normal anatomical variation (Keats, 1993).

During fetal development, the mandible forms through a series of intricate processes involving

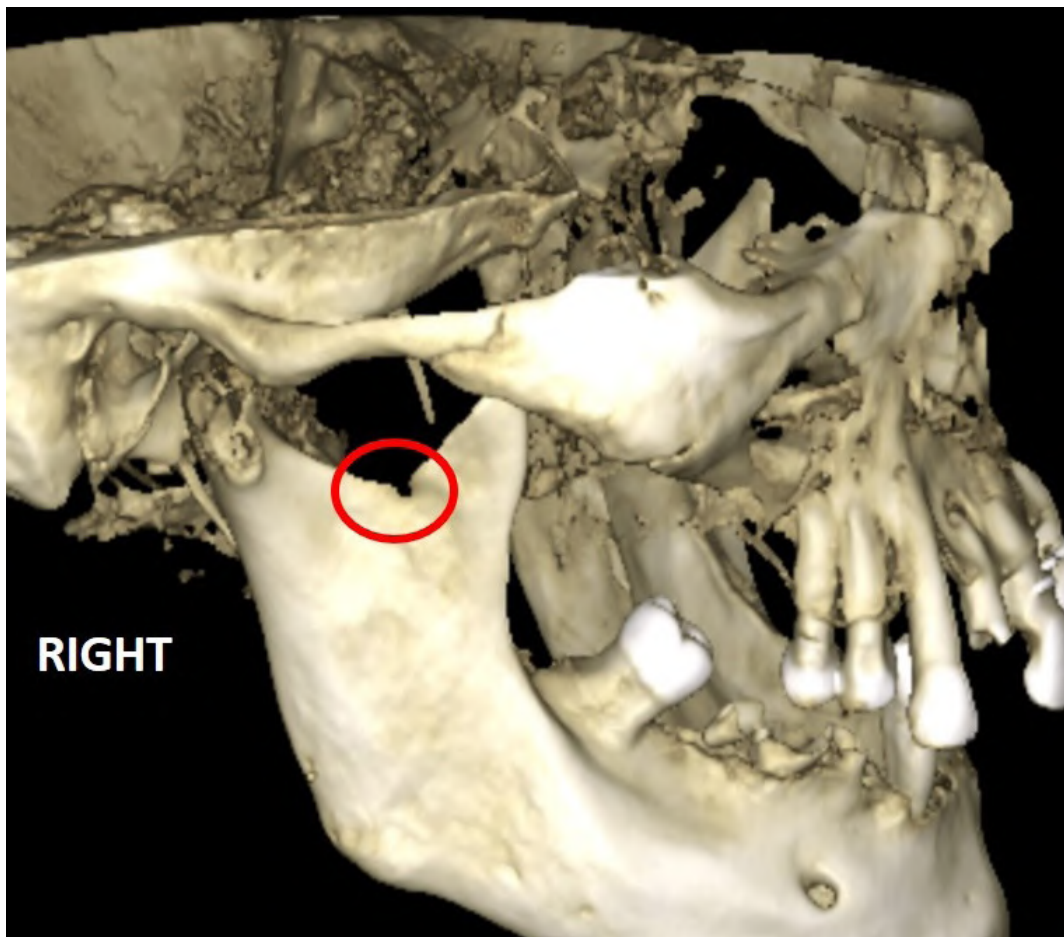


Fig. 2.- Coronoid foramen in the right sigmoid notch in the 3D rendered image.

the migration and fusion of neural crest cells, which give rise to various craniofacial structures. The specific factors that lead to the formation or absence of the coronoid foramen are not entirely understood, and they are likely influenced by genetic and environmental factors (Hauser and De Stefano, 1989). In some cases, the coronoid foramen may be present due to incomplete fusion or perforations in the bone during development. The majority of the foramina and canals gradually dis-

appear between birth and the first year of life. It is important to emphasize that the presence of the coronoid foramen is generally considered a normal anatomical variation, and is not necessarily associated with any pathology or functional impairment (Arey, 1924; Hast and Garrison, 2000; Hauser and De Stefano, 1989; Keats, 1993).

The mandibular coronoid foramen's evolutionary hypothesis states that, apart from the elephant's, no coronoid foramina have ever been



Fig. 3.- Coronoid foramen in CBCT sections; A: Sagittal; B: Coronal; C: Axial.

seen in humans or any other Proboscidean. A specimen of “*Elephas Maximus*” was interpreted by Ferretti and Debruyne in 2010 to have a coronoid foramen that “merged with the alveolus of the distal most erupting molar” to produce a coronoid canal (Ferretti and Debruyne, 2010). Tassy and Shoshani (1988) originally recognized this coronoid canal as a synapomorphy of paenungulates. This feature has been documented in the fossil Macroscelididae and is regularly found in the majority of adult paenungulates (Tassy and Shoshani, 1988).

Sometimes anatomical landmarks may be difficult for the surgeon to locate due to these variations. When reviewing head and neck imaging, it is the radiologist’s responsibility to closely examine the topographic anatomy to look for variations and record them, especially if surgery is being considered. Higher imaging modalities, including magnetic resonance imaging, are required in order to comprehend and analyze the contents of the coronoid foramen (Sferlazza et al., 2022).

Such variability in the mandible could render it difficult to provide appropriate anesthesia for routine dental treatments. Because neurovascular bundles can occupy such foramina, in such instances treatment plans for jaw surgeries may also need to be modified. Furthermore, the involvement of the contents of such foramina may result in unanticipated consequences such as hemorrhage and postsurgical paresthesia. Recognizing such variances has special significance for dental implants and other surgical procedures like orthognathic or corrective mandibular surgeries, which entail diagnostic methods and therapeutic measures (Iwanaga et al., 2020; Yammine, 2014).

In conclusion, the identification and understanding of anatomical variations such as the mandibular coronoid foramen are crucial for dental and maxillofacial professionals in clinical practice. This case report sheds light on the presence of a rare accessory foramen in the mandibular coronoid process, emphasizing the significance of meticulous anatomical knowledge in surgical and diagnostic procedures. The recognition of such variations holds implications for oral surgery, anesthesia administration, and even fo-

rensic investigations. As we continue to uncover the intricacies of craniofacial anatomy, this report underscores the importance of comprehensive pre-operative assessments and interdisciplinary collaboration, ensuring optimal patient care and contributing to the evolving landscape of oral and maxillofacial sciences.

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